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## **Trabalho Final de Mestrado Integrado em Medicina**

***Dermatological Emergencies:  
One year data analysis of 8620 patients in a  
Portuguese tertiary teaching hospital.***

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## ABSTRACT

**Background:** Skin conditions frequently motivate Emergency Department(ED) visits. While most are benign in course, some will present as true dermatological urgencies/emergencies, requiring admission.

**Objective:** To present data on the skin diseases most frequently found in the ED, and those most frequently requiring admission at a Portuguese tertiary teaching hospital. To explore association between epidemiological variables and frequency of diagnoses in this context.

**Methods:** A retrospective study was conducted, including all patients observed during 2012 in the Dermatology Emergency Consultation (DEC), in Hospital de Santa Maria (HSM) Lisbon, Portugal. Association between epidemiological variables (gender and age of patients, and season of the year) and frequency of diagnoses was searched.

**Results:** 8620 patients were observed by a dermatologist during 2012, in the ED, constituting 3.9% of all ED Consults in HSM.

Overall, 333 diagnoses were made, the most frequent of which was Eczema Non-Otherwise-Specified (9.4%). However, infectious and parasitic diseases constituted the leading motive for DEC visit (31.5%).

Only 264 patients were admitted, with 65 diagnoses motivating admission. Nine diagnoses alone constituted 60% of all motives for admission: Cellulitis (20.5%), Erysipelas (7.5%), Drug Induced Eruption (7.1%), Psoriasis (6.3%), Bullous Pemphigoid (4.3%), Erythroderma (4.3%), Lymphoma (3.5%), Herpes Zoster (2.8%) and Eczema (2.4%). Infectious and parasitic diseases constituted the leading cause to admission (34.7%).

Association between frequency of diagnoses and gender, age, and season of the year was found.

**Conclusion:** Despite the variety of dermatologic pathologies, only a restrict group of diseases is responsible for most of the true dermatological urgencies/emergencies. Therefore, where a dermatologist isn't readily available, knowledge on these entities, as well as the demographic and environmental data, may add to the management of these patients.

**Key-words:** Dermatological emergencies; Emergency Department; Epidemiology; Skin diseases.

## RESUMO

**Introdução:** As dermatoses constituem uma causa frequente de recurso aos Serviços de Urgência (SU). Apesar de a maioria destas situações não ser potencialmente grave, alguns casos constituem verdadeiras urgências/emergências, necessitando de internamento.

**Objectivos:** Apresentar dados sobre as dermatoses mais frequentes no SU de um hospital terciário universitário em Lisboa, bem como aquelas que mais frequentemente necessitam de internamento. Explorar a associação entre variáveis epidemiológicas e a frequência dos diagnósticos, neste contexto.

**Métodos:** Conduziu-se um estudo retrospectivo, incluindo todos os doentes observados na Consulta de Urgências de Dermatologia (CUD), durante o ano de 2012, no Hospital de Santa Maria em Lisboa. Procurou-se associação estatística entre variáveis epidemio-demográficas e a frequência de diagnósticos.

**Resultados:** Em 2012, 8620 pacientes foram observados por um Dermatologista, no SU, constituindo 3.9% de todos os episódios do SU.

No total, encontraram-se 333 diagnósticos diferentes, sendo o mais frequente o Eczema Sem Outra Especificação (9.4%). Contudo, as causas infecciosas constituíram o principal motivo de recurso às CUD (31.5%).

Apenas 264 pacientes foram internados, com 65 diagnósticos a motivar internamento. Nove diagnósticos foram responsáveis por 60% dos internamentos: Celulite (20.5%), Erisipela (7.5%), Toxidermia (7.1%), Psoríase (6.3%), Penfigóide Bulhoso (4.3%), Eritrodermia (4.3%), Linfoma (3.5%), Herpes Zoster (2.8%) e Eczema (2.4%). As causas infecciosas constituíram o principal motivo de internamento (34.7%).

Encontrou-se associação entre o género e idade do doente, e estação do ano, e a frequência dos diagnósticos.

**Conclusões:** Apesar da diversidade de dermatoses encontrada nos SU, apenas um grupo restrito de patologias constitui verdadeiras urgências dermatológicas. Assim, onde não existam dermatologistas disponíveis para avaliar estes doentes, o reconhecimento destas entidades, bem como a ponderação de variáveis epidemiológicas simples, pode auxiliar na orientação diagnóstica e terapêutica destes doentes.

## **Introduction**

It is estimated that, each year, 25 to 43% of individuals may be afflicted by a skin disease<sup>1</sup>, and that 4 to 20 % of all Emergency Department (ED) Consultations are due to dermatological pathology<sup>2,3</sup>. Nevertheless, dermatologic diseases remain disregarded by the general population and non-dermatologists alike as predominantly benign conditions, with little potential to cause grim complications. Contrary to this misconception, both true primary dermatological pathologies and systemic diseases with cutaneous involvement often require urgent care and admission, as they may result in severe disability and even death, and a prompt diagnosis and adequate treatment remain the only strategy for improving the outcome. As there are several national constraints in the referral of patients with cutaneous problems to a dermatologist the existence of centers for rapid assessment of dermatological acute conditions is in fact a need.

For these reasons, and considering that there are more than 3000 skin conditions described<sup>4</sup> and the challenges found in the clinical setting of an ED, it is of the utmost importance to describe the most frequent pathologies thereof found and those that most often require admission, in order to provide the best care available.

It is therefore our aim to provide an in-depth analysis of the casuistic of the Dermatology Emergency Consultations (DEC) of Hospital de Santa Maria, a tertiary teaching hospital in Lisbon, Portugal, from the year of 2012, the first of its kind regarding this subject, in our country.

## **Materials and methods**

We gathered information from the DEC logbooks from January 1<sup>st</sup> to December 31<sup>st</sup> of 2012, pertaining to the gender and age of the patient, date of consultation, and presumptive diagnosis. All diagnoses were encoded individually, as separate nosological entities. When a necessary specifier for a specific diagnosis wasn't recorded, the term Non-Other-Especified (NOS) was

applied; for instance, when the recorded diagnosis was Eczema, without any reference to the type, it was encoded as Eczema NOS.

All nosological entities found were further clustered into 26 groups of diseases, according to their characteristics: Drug Induced Dermatoses; Urticarias; Dermatitis; Bacterial Infections; Benign Neoplasms; Bullous Diseases; Connective Tissue Diseases; Diseases of Pigmentation; Acne and acneiform dermatoses; Alopecias; Non-vasculitic vascular diseases; Vasculitic Diseases; Environment related diseases; Fungal diseases; Lymphoma and related diseases; Malignant and Premalignant neoplasms; Metabolic Diseases; Diseases of the nails; Erythematous diseases; Parasitic infections; Photo-related diseases; Reactive and Inflammatory diseases; Viral Infections; Sexually Transmitted Infections (STIs); Genital Lesions not related to STIs; Others.

All patients were further categorized into 3 age groups: < 18 years old; from 18 to 65 years old; > 65 years old. Month of consultation was further recoded to season of the year, in the following manner: January, February and March were considered as winter months; April, May and June as spring months; July, August and September as summer months; and October, November and December as autumn months.

Furthermore, the registries of admission for this period were consulted in order to determine which patients had been admitted through the DEC.

Data were analyzed with IBM SPSS Statistics v21. Chi-Square tests were run where appropriate, and when independence wasn't found, Z-tests for comparison of column proportions were conducted, using Bonferroni method.

## **Results**

During 2012, a total of 220,229 consultations were recorded at Santa Maria's ED, 42,450 of which were observed at the Pediatric ER Department, and the remaining 177,779 were observed at the Adult ED. A total of 8620 patients were observed at the DEC, 1249 (14.5%) of whom were of pediatric age. Therefore, in 2012, DEC constituted 4.2% of the Adult ED Consultations and

2.9% of Pediatric ED Consultations, making up 3.9% of all ED Consultations made during 2012.

A mean of 23.6 DEC were made daily during this year. Monday was the day when more consultations took place (17.5% of all DEC), and Saturday and Sunday were the days with the least number of consultations (10.6% and 10.3%, respectively), with progressively decreasing frequency of consultations from Monday to Sunday.

We observed that summer months (July, August and September) were the months with the highest number of DEC (9.3%, 9.9% and 9.0% of all DEC, respectively), being April the month with the least consultations (7.1% of all DEC).

Regarding gender, 55.9% of patients were female, while the remaining 44.1% were male.

Concerning age, 15% of the patients were younger than 18 years old, 62% were in the 18-65 years old range and the remaining 23% were older than 65 years. Mean age of the patients was  $43.29 \pm 24.53$  (standard deviation) years old, with ages ranging from newborns to 103 years old (Fig.1).

Overall, 333 different nosological entities were found, the most frequent being: Eczema non-otherwise specified (NOS) (9.4%), Urticaria NOS (5.2%), Drug Induced Eruption (4.1%), Scabies (4.0%), Herpes Zoster (3.9%), Cellulitis (3.3%), Pytiriasis Rosea (2.3%), Erysipelas (2.3%), Atopic Dermatitis (2.2%), Arthropod bite (2.2%), Stasis Dermatitis (2.2%) and Psoriasis (2.0%).

Remarkably, in the pediatric group, only 20 diagnoses of viral exanthematic diseases (4 chickenpox and 16 infectious exanthemas NOS) were made in the entire year, corresponding to 1% of all dermatological diseases in pediatric age in our DEC.

After clustering the individual diagnoses into groups of diseases, we found that the most common cause that led to a DEC visit were Dermatitides (19.8% of all DEC). However, with a more careful analysis of the data shown in table 1, we can conclude that if we consider infective diseases as a whole, irrespective of

etiological pathogen (viral, bacterial, fungal or parasitic) then it clearly becomes the leading motive for a DEC, being responsible for 31.5% of all DEC.

We also found association between groups of diseases and both gender, age group and season of the year, at 0.05 level, which is extensively described in Table 1, but is summarized in the next few paragraphs.

At 0.05 level, Urticarias, Connective Tissue Diseases, Non Vasculitic Vascular Diseases, Environment Related Diseases, and Reactive and Inflammatory Dermatoses were more frequently found in females than in males. On the contrary, Malignant and Premalignant Neoplasms, Metabolic Diseases, Sexually Transmissible Infections (STIs), and Genital Lesions Not Related to STIs were all more frequently found in males, when compared to females.

Regarding association between disease groups and age groups: Drug Induced Dermatoses were more frequent in the elderly, as were Bacterial Infections, Bullous Diseases, Vasculitic and non Vasculitic Vascular Disorders, Lymphomas, Malignant and Premalignant Neoplasms, while Erythematousquamous, Reactive and Inflammatory dermatoses and Parasitic diseases were less frequent in this age group, and Alopecias were never a cause for this age group to come to the DEC.

Urticarias were more frequently found in the young adult, as were Acne and Acneiform diseases, and both STIs and non STI related genital lesions.

In children, Parasitic Infections, Viral Infections, Fungal Diseases, Diseases of Pigmentation and Dermatitis were found to have significantly higher frequencies when compared with the other age groups, while Drug Induced Dermatoses, Lymphomas and related diseases, Malignant and Premalignant Neoplasms and Metabolic Diseases were rare or virtually non-existent.

Concerning the association between disease groups and season of the year we found Dermatitis to be a significantly more frequent motive for consultation during winter months. In the same manner, Photo-related diseases were more frequently found during spring and summer, as were Connective Tissue Diseases. On the other hand, Environment related diseases were less

frequently found during winter, as were both Parasitic Infections and Erythematousquamous during summer months.

Of all patients who have visited the DEC, only 264 were admitted, due to a severe presentation of disease. We therefore estimate that only 3.1% consultations of the DEC, and 0.1% of all ED Consultations in our center constituted an indication for hospitalization.

We found that only 65 different diagnoses were motive for admission, the most frequent of which were: Cellulitis (20.5%), Erysipelas (7.5%), Drug Induced Eruption (7.1%), Psoriasis (6.3%), Bullous Pemphigoid (4.3%), Erythroderma (4.3%), Lymphoma (3.5%), Herpes Zoster (2.8%) and Eczema (2.4%). These 9 diagnoses alone were responsible for about 60% of all admissions.

More than half of the causes for admission fell under one of the following three groups of diseases: Bacterial Infections (29.9%), Erythematousquamous diseases (13.4%) and Drug Induced Dermatoses (9.8%). Infective causes, regardless of cause, accounted for 34.7% of all admissions. Distribution of groups of diseases in the admitted patients is shown in Figure 2.

The average duration of admission was found to be  $17.06 \pm 18.96$  (standard deviation) days, with a median stay of 12 days. The length of admission in our Department ranged from 0 days to 162 days, with 10.3% of patients being admitted for 30 days or longer. During the entire year, the outcomes of the admitted patients were the following: 1 patient died on the day of admission, due to a particularly severe condition at the time of admission, where little could be offered; 1 patient with Cellulitis was referred to the Intensive Care Department on the day of admission, and was later discharged; 2 patients were discharged against medical recommendation; 11 patients were transferred to other Departments, usually in the context of a multidisciplinary approach to complex diseases; 249 patients were discharged by our Department, after successful management of their condition.

## **Discussion**

In our study, skin diseases constituted a less frequent motive for ED visits than some authors have stated<sup>2,3</sup>, although our results are in accordance with those



described in Australia<sup>5</sup>, Spain<sup>6</sup>, and South Korea<sup>7</sup>. It is important to note that the true prevalence of dermatological disease in the context of ED in our hospital center is underestimated by our work, as we only assessed the casuistic of the DEC, not the whole ED. Furthermore, we believe the true burden of pediatric patients with dermatological problems may be significantly higher than the 2.9% of all pediatric ED Consultations we report. We base our opinion on the following observations: first of all, our proportion of pediatric ages in Dermatology ER Consultations (15%) are significantly lower than those reported in Spain<sup>6</sup> (44.12%) and France<sup>8</sup> (29%). Furthermore, the amount of viral exanthematic diseases affecting pediatric patients was remarkably low (1% of all children observed at our DEC). As all children were observed by a Pediatrician before being referred to the DEC, we hypothesize that common skin disorders are appropriately diagnosed and treated by the pediatrician, who only refers the patient to a dermatologist when diagnostic or therapeutic challenges arise.

It is of note that the mean number of daily Consultations (23.6) was higher than most described internationally, in previous works.<sup>6,8,10</sup>

We found infective causes to be the most frequent group of pathologies that brought patients to the Dermatology ER Consultation, in accordance to what has been described by other authors<sup>6-9</sup>. However, when taking into account the individual diagnoses, Eczema NOS was found to be the most prevalent diagnosis overall. There is great variability in the literature concerning the frequencies of diagnoses made in this context and this may be due to: prevalence of diseases diverging from country to country; differences in health care systems, where patients from countries with longer waiting lists for primary care consultations may recur more often to ED Consultations due to non-urgent pathologies, or even differences in classification of pathologies for statistical study purposes.

We also found statistically significant differences in most frequent diagnoses and disease groups between genders, age groups and season of the year, suggesting that epidemiological data may assist the clinician in the process of establishing differential diagnoses.

We calculated our admission rate to be 3.1% of all DEC, a value somewhat lower than those found in the published literature<sup>5-7,9-12</sup>, ranging from 4% to

20%. This may reflect that in our Center, patients tend to come for DEC due to non-severe pathologies, possibly due to the long waiting times for both primary care consultations, as well as Dermatology Outpatient Consultations, in consequence of the peculiarities of the Portuguese National Health System. In this aspect, it is important to explain that in Portugal there is still a significant number of patients who still have no designated primary care doctor, due to the shortage of these specialists, particularly in the more peripheral and rural areas. And even those who have a primary care doctor available, often face the difficulty of only having an appointment available in a 2 to 3 week period. The reality is even grimmer when considering the waiting times for a referral consultation in a hospital. For instance, in our center, patients often have to wait for a couple of months after the primary care doctors made a referral, for a dermatology consultation. After this short explanation, it becomes clear that patients who are faced with the appearance of skin changes, that might be pruriginous or even painful, lack the patience to wait for such long periods of time, and prefer to go the ED, where a doctor will promptly evaluate the situation, even though they often know that their situations aren't true emergencies. This might lead, on one hand, to the higher number of patients seen, when compared to other countries, and on the other hand to a proportionally smaller number of true dermatological emergencies, translating into a small rate of admission. Unfortunately, to our knowledge this is the first study of its kind to be conducted in Portugal, so no comparison to other Portuguese centers can be made, although it would be, of course, of great interest.

We found Infections to be the most frequent cause for admission, particularly Bacterial Infections, being Cellulitis the most frequent diagnosis leading to admission. This finding is concordant with those of Spanish<sup>6</sup>, Canadian<sup>9</sup> and Korean<sup>7</sup> researchers, but discordant to others that found Stevens-Johnson Syndrome<sup>11</sup> or Psoriasis<sup>5</sup> as leading causes to admission.

A large number of different diagnoses are made in the DEC (333 in our study), reflecting the diversity of dermatological conditions, but the number of diseases requiring admission is far scarcer (only 65 were identified in our study), and 9 diagnosis alone were responsible for about 60% of all admissions. It is known

that there are many settings where a dermatologist is not readily available for a consultation, so it becomes apparent that an adequate knowledge on these most frequent dermatological emergencies, as well as those less frequent but that require immediate medical action, constitutes a minor effort for the non-dermatologist, but may well be sufficient to provide good care for the majority of the patients that present with dermatological emergencies.

A last point that cannot be overlooked when discussing dermatological urgencies and emergencies is the follow up of patients. Our registries do not contain direct information on the follow up of a sufficient amount of patients, which doesn't allow us to conduct a proper analysis. However, some general indications can be provided. First of all, every patient who was found or suspected to have a sexually transmissible infection, or was considered to be, by clinical judgement, in risk of having one, was immediately referred to a STI outpatient consultation, ran by our Dermatology Department. It is common practice in our department to instruct every patient to come back to the attending doctor in case of need, even if they haven't an appointment. In case of chronic pathologies, or acute pathologies with a longer natural course, follow up consultations are often proposed, and some patients end up being followed in our centre for years, in cases like psoriasis.

Unlike other centers<sup>13</sup>, we do not have specific follow up consultations, nor designated times in our schedules dedicated to these patients. However, we instruct patients to come anytime, in case of need, and, in certain cases, we make an appointment for an outpatient consultation, being the decision on the most suitable option made on the basis of clinical judgement, considering variables such as the pathology on hand, the expected course, the probability of complications and the need for follow up care.

Regarding patients whose condition required admission, it is interesting to note that our average and median duration of admission is somewhat higher than that reported by other centers<sup>14,15</sup>, which may be due, in part, to the high prevalence of Bullous Diseases and Malignant Conditions in our inpatient unit, that may account for a right shift of the statistic trends, due to a more parsimonious evolution and complex management.

## **Conclusion**

We have shown what pathologies were most frequent in the context of DEC, in a Portuguese scenario, and that those are associated with both individual and environmental variables, showing the multifactorial nature of skin disorders, which together with different health care system organization might help explain differences in prevalence of dermatological diseases in the ED setting between studies and countries. By knowing epidemiologic data, clinicians may optimize their presumptive diagnosis in a setting as challenging the ED. Our study further indicates that a relatively small number of dermatological diseases represents the majority of pathologies severe enough to require admission, and as such, the capability of non-dermatologist doctors to diagnose and manage these common situations might prove an effective and low-cost manner to improve patient care.

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Figure 1 - Demographic distribution of patients who came to the DEC during the year 2012. In bold, the normal distribution of ages, for each gender. In male patients, mean age was  $41 \pm 24.42$  (standard deviation) years old, with ages ranging from newborns (0 months old) to 103 years old. In female patients, mean age was found to be  $42 \pm 24.57$  (standard deviation), with ages ranging from newborns (0 months olds) to 99 years old.

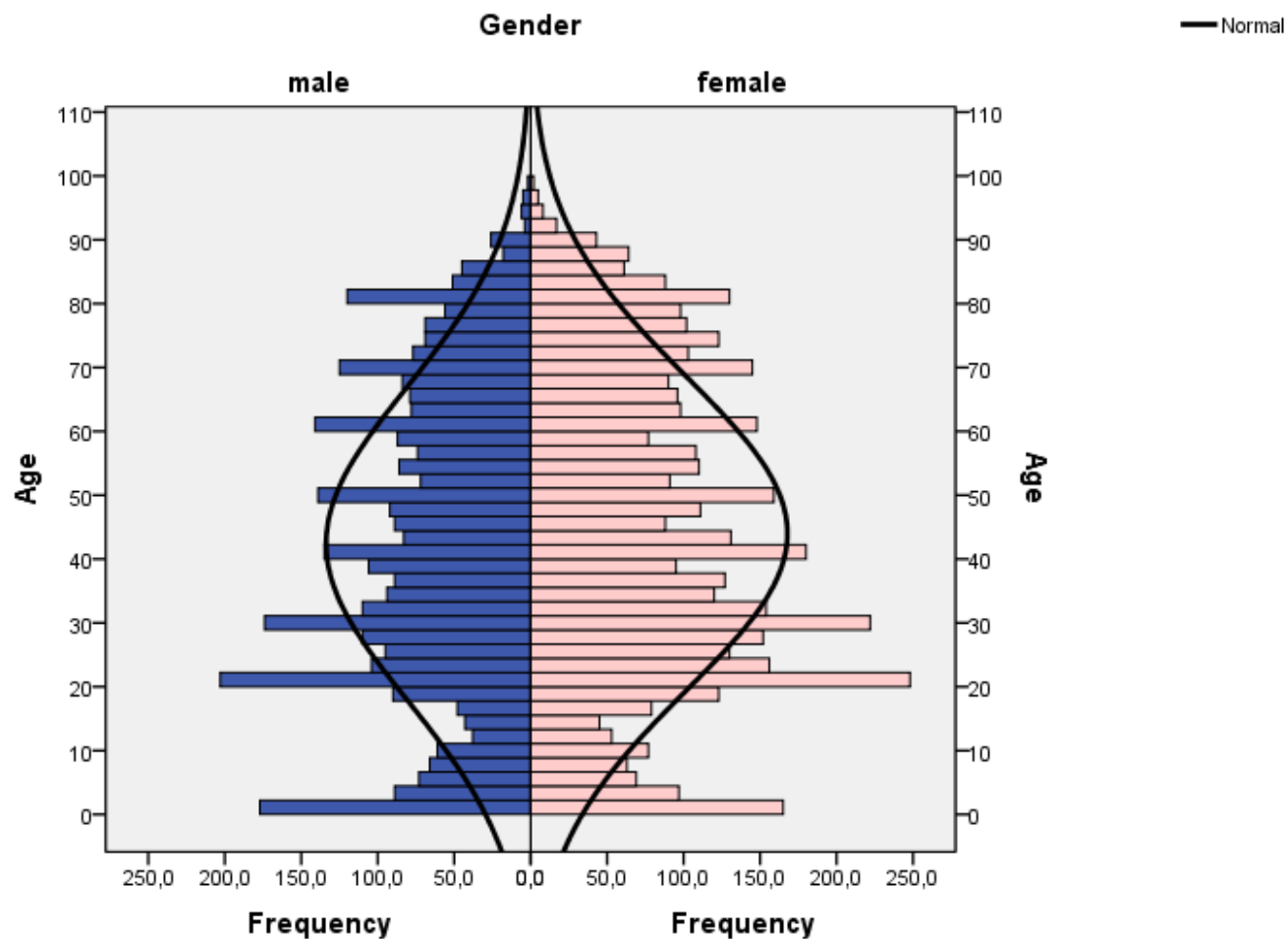


Table 1 – Association between Groups of Diseases and gender and age groups found to be statistically significant at the 0.05 level. Diagnostic groups in descending order of relative frequency. Where statistically significant differences were found, percentages refer to the frequency of the disease relative to the total of diagnosis made in the said subgroup. A- Young Adults (age group between 18-65 years old); E – Elderly Adults (>65 years old) ♀- Female; ♂- Male; P- Pediatric Age(<18 years old).

Group of Diseases	Overall Frequency (%)	Differences in frequency between genders (p<0.05)	Differences in frequency between age groups (p<0.05)
<b>Dermatitides</b>	19.8	-	E (6.8%) > A (4.9%) > P (1.0%)
<b>Bacterial Infections</b>	10.1	-	E (14.4%) > A (9.3%) > P (6.2%)
<b>Viral Infections</b>	8.6	-	P (10.0%) > [A (8.0%) ≈ E (8.9%)]
<b>Urticarias</b>	6.5	♀ (7.8%) > ♂ (4.9%)	A (8.5%) > E (4.5%) > P (1.5%)
<b>Erythematous squamous diseases</b>	6.5	-	[P (8.5%) ≈ A (7.6%)] > E (3.6%)
<b>Fungal Diseases</b>	5.5	-	P (13.0%) > [A (4.5%) ≈ E (3.3%)]
<b>Drug Induced Dermatoses</b>	4.7	-	E (6.8%) > A (4.9%) > P (1.0%)
<b>Reactive and Inflammatory dermatoses</b>	4.7	♀ (5.4%) > ♂ (3.8%)	[P (6.2%) ≈ A (5.1%)] > E (2.7%)
<b>Parasitic Infections</b>	4.4	-	P (9.4%) > A (4.3%) > E (1.5%)
<b>Environment related diseases</b>	4.2	♀ (5.0%) > ♂ (3.1%)	[A (4.6%) ≈ E (4.4%)] > P (2.6%)
<b>Non Vasculitic Vascular Diseases</b>	3.6	♀ (4.2%) > ♂ (3.0%)	E (9.4%) > A (2.2%) > P (0, 7%)
<b>Sexually Transmitted Infections</b>	2.9	♂ (5.3%) > ♀ (1.0%)	A (4.5%) > [P (0.6%) ≈ E (0.3%)]
<b>Diseases of the Nails</b>	2.3	-	-
<b>Benign Neoplasms</b>	2.0	-	[A (4.6%) ≈ E (4.4%)] > P (2.6%)
<b>Acne and Acneiform dermatoses</b>	1.9	-	[A (2.4%) ≈ P (1.7%)] > E (0.8%)
<b>Malignant and Premalignant neoplasms</b>	1.4	♂ (1.7%) > ♀ (1.1%)	E (4.3%) > A (0.6%) > P (0, 0%)
<b>Genital lesions not related to STIs</b>	1.3	♂ (2.4%) > ♀ (0.4%)	A (1.8%) > [E (0.6%) ≈ P (0.4%)]
<b>Photo-related diseases</b>	1.0	-	[A (1.1%) ≈ E (1.1%)] > P (0.3%)
<b>Bullous Diseases</b>	0.8	-	E (2.2%) > [A (0.5%) ≈ P (0.2%)]
<b>Vasculitic Diseases</b>	0.8	-	E (1.6%) > [A (0.7%) ≈ P (0.2%)]
<b>Alopecias</b>	0.6	-	-
<b>Diseases of Pigmentation</b>	0.4	-	P (1.4%) > [A (0.3%) ≈ E (0.1%)]
<b>Connective Tissue Diseases</b>	0.4	♀ (0.5%) > ♂ (0.1%)	-
<b>Lymphoma and related diseases</b>	0.2	-	E (0.8%) > [A (0.1%) ≈ P (0.0%)]
<b>Metabolic Diseases</b>	0.2	♂ (0.3%) > ♀ (0.0%)	-
<b>Others</b>	5.0	-	E (6.8%) > A (4.9%) > P (2.8%)

Figure 2 – Frequency of the different groups of diseases as cause to admission. Less significant groups of diseases were abridged into “Other disease groups” for the sake of clarity. Infective causes (highlighted) irrespective of etiology were the leading cause for admission (34.7% of all admissions), with a clear predominance of bacterial etiology (28.8% of all admissions).



## Leading causes to admission

